Chapter 1 The Biosphere of Life

The peregrine falcon, the rarest raptor on the Canadian prairies, faced extinction in the 1960s. There was a significant reduction in the number of offspring for the peregrine falcon. The reason for the decrease in its numbers was unknown. Scientists investigating the problem suspected the decrease in population was due to fewer young being able to reach adulthood. Studies found that the number of eggs laid in each nest was normal, but for some reason, very few peregrine falcon chicks were being hatched.

In an examination of eggs within the nest, scientists found their answer. The shells of the eggs were too thin and, therefore, broke easily. Further studies, aimed at finding a cause for the thin-shelled eggs, determined that the pesticide DDT was causing the peregrine falcon's eggs to be thin-shelled. As a result of this research, heavy restrictions on the use of DDT in Canada and the United States, along with intensive captive-breeding and reintroduction programs, have helped increase the numbers of this species in Canada. What would the impact on the prairie ecosystem have been if the peregrine falcon had become extinct?

The story of the near extinction of the peregrine falcon highlights the necessity for humans to be good land stewards. Stewardship refers to the need to demonstrate sensitivity and responsibility in pursuing a balance between the needs of humans and a sustainable environment. This includes monitoring and conserving wildlife species and their habitat, as well as protecting and improving the quality of soil, water, air, and other natural resources. Becoming aware of how you can help sustain your local environments will help you become a better steward of the land.

In this chapter you will learn about factors that affect an ecosystem. You will also consider the impact humans have on their environment and the steps people can take to help protect the environment.

Try This Activity

Life in a Fishbowl

Figure D1.1: Peregrine falcons can be tracked.

The near extinction of the peregrine falcon placed a great deal of scrutiny on the survival of this bird. Researchers now use satellite tracking to follow the migration of falcons. Satellite technology provides information about the movement and behaviour of many endangered species. This allows scientists to determine the location of tagged individuals and to monitor conditions, such as temperature. Tagging can also provide data related to preferred nesting locations. Scientists now have a better understanding of what behaviours and conditions may affect the falcon's survival. However, technology alone cannot prevent the extinction of an endangered species.

One outcome of this monitoring is that individuals of the species can be observed virtually around the clock. Despite the fact that peregrine falcons build their nests high above the ground to protect their eggs from potential predators, carefully placed video cameras can record their behaviour. Media awareness regarding this species was enhanced when cameras were installed to monitor nests found in urban centres—the Telus Building in Edmonton and Craigie Hall on the University of Calgary campus. You can find dedicated websites that monitor the success of falcons nesting in both of these cities. It's almost like these falcons are living in a fishbowl and are constantly available for observation. However, unlike tropical fish in an aquarium, the falcons are free to move throughout the urban environment to search out food and other necessities for living.

Have you ever helped maintain an aquarium filled with tropical fish, such as guppies? There are numerous details that require careful attention: the temperature, pH, and oxygen levels of the water, as well as a system to filter the water. What are the requirements for a goldfish to survive in a bowl? Is there a difference between an aquarium filled with guppies and a bowl containing goldfish? Careful examination of the various components that support life in an aquarium can help you understand the work of scientists studying the conditions required to protect many endangered species.

Science Skills

✓ Performing and Recording

Purpose

Identify factors or conditions that will affect the survival of an aquarium's aquatic life. Look for non-living or living factors that will affect the survival of the aquatic life.

Procedure

step 1: Carefully examine an aquarium filled with tropical fish, such as guppies.

step 2: Identify at least five different factors that will directly affect the survival of the tropical fish.

step 3: Repeat steps 1 and 2 in an aquarium containing goldfish.

Analysis

1. Describe factors that are similar between aquariums filled with tropical fish and those filled with goldfish.
2. Describe factors that are different between aquariums containing tropical fish and those containing goldfish.
3. Predict what will happen if you move the tropical fish to the goldfish bowl.